$$\left(Q - \frac{P^2}{4} - \frac{P\mu}{2} + \frac{3\mu^2}{2}\right)\left(\frac{P+\mu}{2}\right) + \mu\left(\frac{P-\mu}{2}\right)^2 = R,$$

$$\frac{1}{4}\left(Q - \frac{P^2}{4} - \frac{P\mu}{2} + \frac{3\mu^2}{4}\right)^2 + \left(Q - \frac{P^2}{4} - \frac{P\mu}{2} + \frac{3\mu^2}{4}\right)\left(\frac{P-\mu}{2}\right) = S,$$

$$\frac{\mu}{4}\left(Q - \frac{P^2}{4} - \frac{P\mu}{2} + \frac{3\mu^2}{4}\right)^2 = T.$$

We have to eliminate μ between these three equations; the resultant between equations of the third and fourth order is given by Salmon; also the resultant between two quartics, from which we may deduce the resultant of a quartic and a quintic. The result will be tremendously complicated; but we must remember the number of double tangents to a non-singular quintic is 120, which naturally suggests an equation of the 120th degree, which I apprehend few mathematicians would like to solve. It is impossible, however, to predict the future of analysis.

I have omitted to take any notice in this paper of the modifications which would be occasioned by double points, hoping, if permitted, to return to the subject.

I would observe in conclusion that the same method applies to the determination of points of inflexion. Thus in the quartic, taking $\alpha, \beta, \gamma, \delta$ for the roots of the equation produced by eliminating between the quartic and a straight line, and putting $\alpha = \beta = \gamma$, we find it easy to eliminate α and δ and to find two equations which will give the inflexional tangents.

XIV. "On the Determination of the Photometric Intensity of the Coronal Light during the Solar Eclipse of August 28–29, 1886. Preliminary Notice." By Captain W. DE W. ABNEY, C.B., R.E., F.R.S., and T. E. THORPE, Ph.D., F.R.S. Received June 21, 1888.

Attempts to measure the brightness of the corona were made by Pickering in 1870, and by Langley and Smith, independently, in 1878, with the result of showing that the amount of emitted light as observed at various eclipses, may vary within comparatively wide limits. These observations have been discussed by Harkness ('Washington Observations for 1876,' Appendix III), and they will be again discussed in the present paper. Combining the observations it appears that the total light of the corona in 1878 was 0·072 of that of a standard candle at 1 foot distance, or 3·8 times that of the full moon, or 0·0000069 that of the sun. It further appears from the photographs that the coronal light varied inversely as the square of

the distance from the sun's limb. Probably the brightest part of the corona was about 15 times brighter than the surface of the full moon, or 37,000 times fainter than the surface of the sun.

The instruments employed by the authors in the measurement of the coronal light on the occasion of the solar eclipse of August 28–29, 1886, were three in number. The first was constructed to measure the comparative brightness of the corona at different distances from the moon's limb. The second was designed to measure the total brightness of the corona, excluding as far as possible the sky effect. The third was intended to measure the brightness of the sky in the direction of the eclipsed sun. In all three methods the principle of the Bunsen photometric method was adopted, and in each the comparison-light was a small glow-lamp previously standardised by a method already described by one of the authors in conjunction with General Festing. In the first two methods the photometer-screen was fixed, the intensity of the comparison-light being adjusted by one of Varley's carbon resistances: in the third the glow-lamp was maintained at a constant brightness, the position of the screen being adjusted along a graduated photometer bar, as in the ordinary Bunsen method. Full details of the construction of the several pieces of apparatus will be given in the full paper.

The observations during the eclipse were made at Hog Island—a small islet at the south end of Grenada, in lat. 12° 0′ N. and long. 61° 43′ 45″ W., with the assistance of Captain Archer and Lieutenants Douglas and Bairnsfather of H.M.S. "Fantôme." The duration of totality at the place of observation was about 230 seconds, but measurements were possible only during 160 seconds, at the expiration of which time the corona was clouded over. A careful discussion of the three sets of measurements renders it almost certain that the corona was partially obscured by haze during the last 100 seconds that it was actually visible. Selecting the observations made during the first minute, which are perfectly concordant, the authors obtain six measurements of the photometric intensity of the coronal light at varying distances from the sun's limb, from which they are able to deduce a first approximation to the law which connects the intensity of the light with the distance from the limb.

The observations with the integrating apparatus made independently by Lieutenants Douglas and Bairnsfather, agree very closely. It appears from their measurements that the total light of the corona in the 1886 eclipse was—

Douglas	0·0123 standard candle.
Bairnsfather	0·0125 ,,
Mean	0·0124

at a distance of 1 foot.

In comparing these observations with those made during the 1878 eclipse, it must be remembered that the conditions of observation on the two occasions were widely different. The observations in the West Indies were made at the sea's level, in a perfectly humid atmosphere and with the sun at no greater altitude than 19°. Professor Langley, in 1878, observed from the summit of Pike's Peak in the Rocky Mountains at an altitude of 14,000 feet, in a relatively dry atmosphere and with the sun at an altitude of 39°.

From observations on the transmission of sunlight through the earth's atmosphere (Abney, 'Phil. Trans.,' A, vol. 178 (1887), p. 251) one of the authors has developed the law of the extinction of light, and, by applying the necessary factors, it is found that the intensity of the light during the 1886 eclipse, as observed at Grenada, is almost exactly half of that of which would have been transmitted from a corona of the same intrinsic brightness when observed at Pike's Peak. Hence to make the observations of Professor Langley comparable with those of the authors, the numbers denoting the photometric intensity of the corona in 1878 must be halved. The result appears, therefore, that whereas in 1878 the brightness of the corona was 0·0305 of a standard candle at a distance of 1 foot, in 1886 it was only 0·0124 of a candle at the same distance. Several of the observers of the West Indian Eclipse (including one of the authors) were also present at the eclipse of 1878, and they concur in the opinion that the darkness during the 1886 eclipse was very much greater than in that of 1878. The graduations on instruments, chronometer faces, &c., which were easily read in 1878, were barely visible in 1886. In explanation of this difference in luminous intensity it must not be forgotten that the 1878 eclipse was not very far removed from a period of maximum disturbance, whereas in 1886 we were approaching a period of minimum disturbance.

XV. "Seismometric Measurements of the Vibration of the New Tay Bridge during the Passing of Railway Trains." By J. A. Ewing, B.Sc., F.R.S., Professor of Engineering in University College, Dundee. Received June 20, 1888.

The absolute methods of seismometry which have been developed during recent years in Japan, and have been applied to the measurement of earthquakes there and elsewhere, may serve a useful purpose in determining the extent and manner of the shaking to which engineering structures are subject through storms of wind, moving loads, or other causes of disturbance. Existing forms of seismograph are well suited for measurements of this kind, provided the frequency